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I further certify that the above application is now proceeding in the name of INNOVATIVE MOTORCYCLE TECHNOLOGY PTY. LTD pursuant to the provisions of Section 113 of the Patents Act 1990.

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Eleventh day of August 2003

J. Billingsley

JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES

Australia
Patents Act 1990

Provisional Specification
Provisional Patent

SIMPLE DUAL FUNCTION LEVER

The invention is described in the following statement:

Simple Dual Function Lever

Description

This invention is intended to improve the controllability of motorised vehicles fitted with handlebar mounted controls and a foot operated brake. It is based upon the principle that the operators hands should always be on the handlebars but their feet should be free to perform other functions.
This invention came about as a result of difficulties I had in operating the rear brake of a motorcycle whilst negotiating difficult terrain.
The invention consists of a single finger operated lever that is able to move in two ways:

1. Intowards the handlebars
2. Downward tilt relative to the handlebars (i.e in a vertical plane)

Because the lever is able to move in two ways this enables the operator to control two functions, for example, the rear brake and the clutch or the rear brake and the front brake.

To further assist in the understanding of this invention reference will now be made to the following drawings.
Figure One shows an example of the invention that utilises two master cylinders that are positioned at ninety degrees relative to each other. It is shown in partial cross-section form looking down from above the unit.
Figure two shows the same example of the invention but looking at the unit from in front of the vehicle. Also note that it is shown on the right hand side of the vehicle whereas figure one shows the invention fitted to the left hand side of the vehicle.
For example only all the drawings and the dialogue associated with them will describe a system fitted to a motorcycle operating the clutch and the rear brake of that vehicle.
Referring to figure one and figure two pulling the Operator's Lever (1) intowards the Handlebars (16), i.e in direction 'A' causes the Operator's Lever (1) to pivot at the Clutch Activation Pivot (2).This motion pushes via the Clutch Activation Adjuster (6), the Clutch Activation Pin (7) which in turn pushes the Clutch Master Cylinder Piston (4) and operates the vehicles clutch.
Pushing the Lever down, i.e in direction 'B' causes the Operator's Lever (1) to rotate around the Brake Actuation Pivot Line (3). This is made possible via the Brake Activation Bearing (12). This rotation around the Brake Actuation Pivot Line moves the Brake Adjuster (17) which via the Brake Activation Pin (15) moves the Brake Master Cylinder Piston (5) thus operating the vehicle's rear brake.
Also shown in figure One. Two and Two A is an Overlap Adjuster. This set up consists of a Cam Plate (10) which is able to slide fore and aft in a 'T' Slot in the Main Bracket. The position of the Cam Plate (10) is controlled by the Overlap Adjuster Cam (11). Note the Cam Plate (10) is spring loaded against th Overlap Adjuster Cam. As the Operators Lever (1) is pulled intowards the handlebars, i.e in direction A the Cam Follower Bearing (9) which is attached to the operators lever slides across the Cam Plate (10). When the Cam Follower Bearing (9) contacts the Ridge (30) on the Cam Plate (10) it forces the Operators Lever(1) in a downward direction, i.e Direction 'B' and the following ramp on the Cam Plate (10) continues to force the Operators Lever in this direction. This downward movement of the Operators Lever (1) causes the rear brake to be applied. This means that the position of the Overlap Adjuster Cam (11) changes the point at which the rear brake is applied when the Operators Lever (1) is being pulled towards the Handlebars (16), i.e in Direction 'A' an thus the Overlap Adjuster Cam (11) controls the overlap between the clutch and the brake functions.
Note that it is envisaged that the Overlap Adjuster Cam (11) would be operated by the operator's fingers or thumb and that it's settings can be changed whilst the vehicle is in motion.
Note also that the operator can at any time apply more breaking force than the Cam Plate (10) supplies by pushing the Lever in a downward direction, i.e in Direction 'B'.
Also shown in Figure Two are two cables (29) and (34). Both these cables and the brake pedal system shown in Figure Two B are optional but they show a method by which if desired the Dual Function Lever can be foot operated.

Cable (29) is connected and is the same cable as Cable (36) shown in Figure Two B. In this system there is no Brake Master Cylinder mounted on the handlebars. The function performed by the Operators Lever (1) is identical to as previously described but when the Operators Lever (1) is moved in Direction 'B', i.e downwards either by downward pressure by the operator, or by downward force provided by the Cam Plate (10) the Cable (29) and (36) pulls the Brake Pedal (31) down operating the rear brakes via the Brake Master Cylinder (35). This system enables the rear brake to be operated by either foot or hand control or in fact both simultaneously.

Another method of being able to operate the rear brake by foot or hand would be to use a cable such as depicted by Cable (34). In this system the Brake Master Cylinder is mounted back on the Handlebars as shown in Figure Two and the Master Cylinder (35) does not exist. Configured in this the rear brakes can be applied by the Pedal via Cable (34) which pulls the Operators Lever (1) in Direction 'B' thus actuating the handlebar mounted Brake Master Cylinder.

Another possible variation on this set-up would be to have Cable (34) pull the Operators Lever intowards the handlebars, i.e in Direction 'A'. Set up in this manner the foot pedal would now operate the Clutch and via the Cam Plate (10) the rear brakes.

Figure Three and Four show another example of the invention which although has a different mechanical layout as the example shown by Figures One and Two performs in the same way so far as the operator is concerned. Figure Three shows a partial cross-section of the invention looking from the left hand side of the vehicle. Note from this angle the Operators Lever (1) is difficult to view.

Figure Four shows this example of the invention from two views. The top drawing shows a partial cross-sectional view of the invention fitted to the right hand side of the vehicle being viewed from in front of the vehicle. The bottom drawing shows a partial cross-section of the same example of the invention but this time it is fitted to the left hand side and is being viewed from above. In this example when the Operators Lever (1) is pulled intowards the Handlebars (16), i.e in Direction 'A' the Operators Lever (1) pivots around the Clutch Actuation Pivot (2). This moves the Clutch Actuation Adjuster (6) which moves the Clutch Actuation Pin (7) which moves the Clutch Master Cylinder Piston (4) in turn operating the Clutch.

Because the Brake Adjuster (17) contacts the Brake Actuation Pin (15) at a point in line with the Clutch Actuation Pivot (2) the movement of the Operators Lever (1) in Direction 'A' notwithstanding the effect caused by the Cam Plate (10), causes no movement of the Brake Master Cylinder Piston (5).

.If the Operators Lever (1) is moved downwards, i.e in Direction 'B' the Operators Lever (1) pivots around the Brake Actuation Pivot (3) which moves the Brake Adjuster (17) which moves the Brake Actuation Pin (15) in turn moves the Brake Master Cylinder Piston (5) operating the rear brakes. The Overlap Adjuster Cam (11) and the Cam Plate (10) operate in the same manner as previously described for Figures One and Two.

Figure Five shows another example of the invention. This figure shows this example in partial cross-section form, looking at it from in front of the vehicle. Note for reasons of clarity the supporting bracket is not shown. It will be assumed however that this bracket ties the Master Cylinders and the Pivot Point (2) to the handlebars.

Figure Five A shows this example of the invention looking from the left hand side of the vehicle again with no supporting bracket shown. Pulling the Operators Lever (1) intowards the handlebars i.e in Direction 'A' causes the Lever (1) to rotate around the Pivot (2) which causes both the Clutch Adjuster (6) and the Brake Adjuster (17) to move. This movement actuates both the Clutch Freeplay Adjuster (21) and the Brake Freeplay Adjuster (22). It is envisaged that these Adjusters would be set so that the Brake Freeplay Adjuster (22) would be adjusted to have more freeplay than the Clutch Freeplay Adjuster. Set in this fashion when the Operators Lever (1) is pulled towards the Handlebars (16), i.e in Direction 'A' the clutch will be operated first then at a predetermined point the rear brake will be operated. Pushing the Operators Lever (1) downward, i.e in Direction 'B' will cause the Lever (1) to rotate around the Brake Actuation Pivot Line (3). This moves the Brake Actuation Adjuster first taking up the play in the Brake Freeplay Adjuster and then operating the rear brake. Note at any stage during the Operating Levers (1) travel in Direction 'A' the Lever (1) can be also moved in Direction 'B' the effect of which will be to increase the bias to the rear brake function.

Also shown in Figure Five is the Rotating Spindle (20). This Spindle is designed to reduce the friction associated with the finger(s) sliding over the Operators Lever as it is being operated.

Note; to assist in reducing the effort required to operate the Dual Function Lever it is possible by careful positioning of components to have a Clutch Actuating Adjuster to go 'over centre' after the clutch is disengaged. This reduces the force required for the remainder of the travel of the Operators Lever (1) in Direction 'A'.
Also note the example of the Dual Function Lever with the Brake Pedal uses cables, this is for example only and could in fact be operated by hydraulics or by any other suitable means.

For reasons of clarity not all the features of this invention have been shown or described in each given example however these features could if desired be applied to every example of the invention; i.e the example shown in Figure Five doesn't show an overlap adjustment system as used in the example shown in Figures One and Two. This feature could however be used on any example of the invention and furthermore it will be realised that any feature shown in any example could be utilised in any other example.

It will be realised that the Simple Dual Function Lever according to this invention is not restricted to the use of hydraulic cylinders as shown in the example but may use other suitable forms of operating the clutch or brake, for example; pneumatic, electric or any other means by which the clutch or brake can be effectively activated. It will be further realised the leverage ratios and hydraulic cylinder sizes shown are for example only and an individual vehicle may require re-positioning of pivot points, changing of leverage ratios or cylinder sizes or the use of power assistance to increase efficiency.

OWEN HUTCHISON **FEBRUARY 18TH 2003**

1. Operators Lever
2. Clutch Activation Pivot
3. Brake Activation Pivot Line
4. Clutch Master Cylinder Piston
5. Brake Master Cylinder Piston
6. Clutch Activation Adjuster
7. Clutch Activation Pin
8. Fluid Reservoir
9. Cam Follower Bearing
10. Cam Plate
11. Overlap Adjuster Cam
12. Bearing for Brake Activation Pivot
13. Thrust Bearing for Clutch Activation
14. Brake Master Cylinder Hydraulic Outlet
15. Brake Activation Pin
16. Handlebars
17. Brake Adjuster
18. Operator's Lever Height Adjuster
19. Clutch Hydraulic Outlet
20. Spindle
21. Clutch Freeplay Adjuster
22. Brake Freeplay Adjuster
23. Brake Master Cylinder
24. Clutch Master Cylinder
25. Ball and Spring Detent for tactile indication of brake activation
26. Maximum Lever Tilt Adjuster
27. Hinge in operators lever (allows upwards motion against a spring to prevent accident damage)
28. Operators Lever Backstop Adjuster
29. Optional Cable Operated Brake Pedal
30. 'Ridge' on overlap cam plate to facilitate tactile feel of brake operations
31. Brake Pedal
32. Footpeg
33. Brake Pedal Pivot
34. Cable for pedal operation of the rear brake
35. Rear Brake Master Cylinder
36. Cable for hand operation of rear brake pedal

Abstract

A single finger operated Lever fitted to a motorised vehicle that moves in two ways, that is capable of operating two functions either separately or simultaneously.

FIGURE ONE

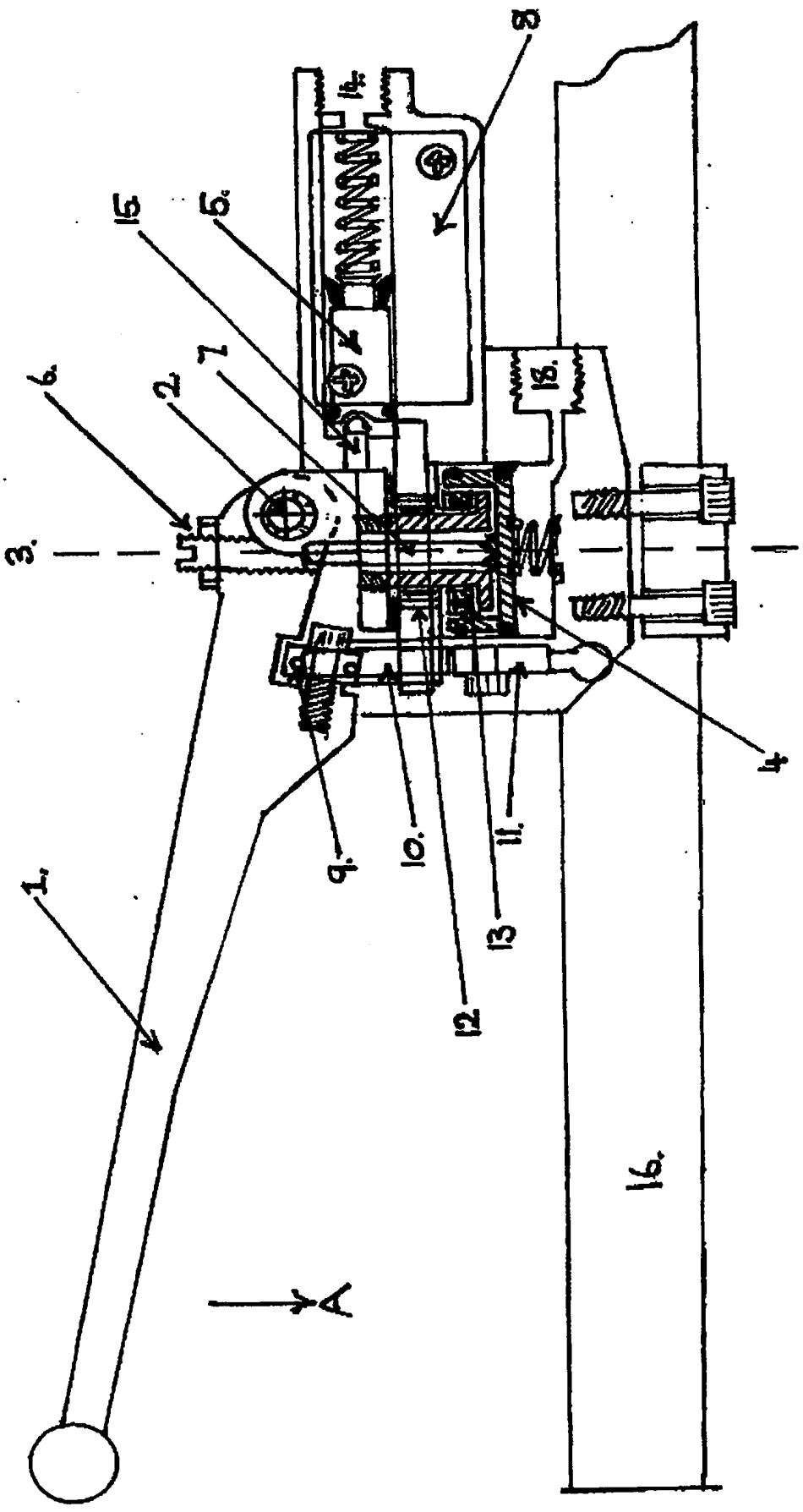


FIGURE TWO

FIGURE TWO A

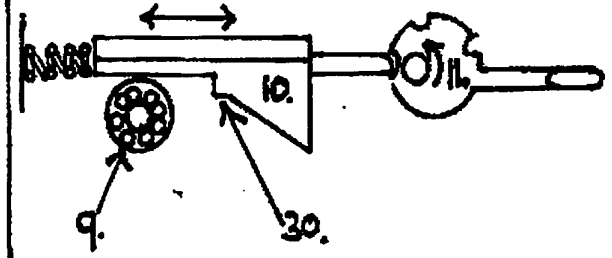
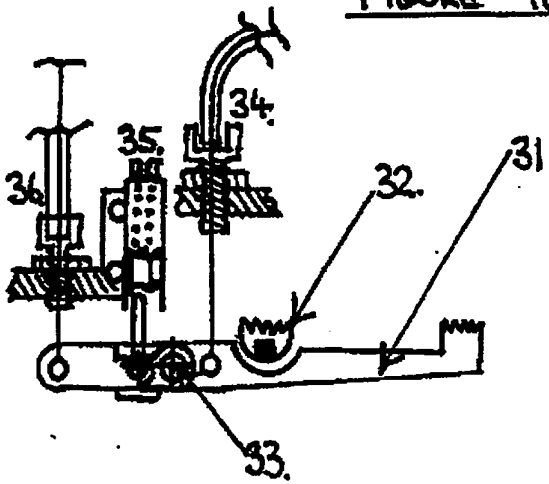


FIGURE TWO B



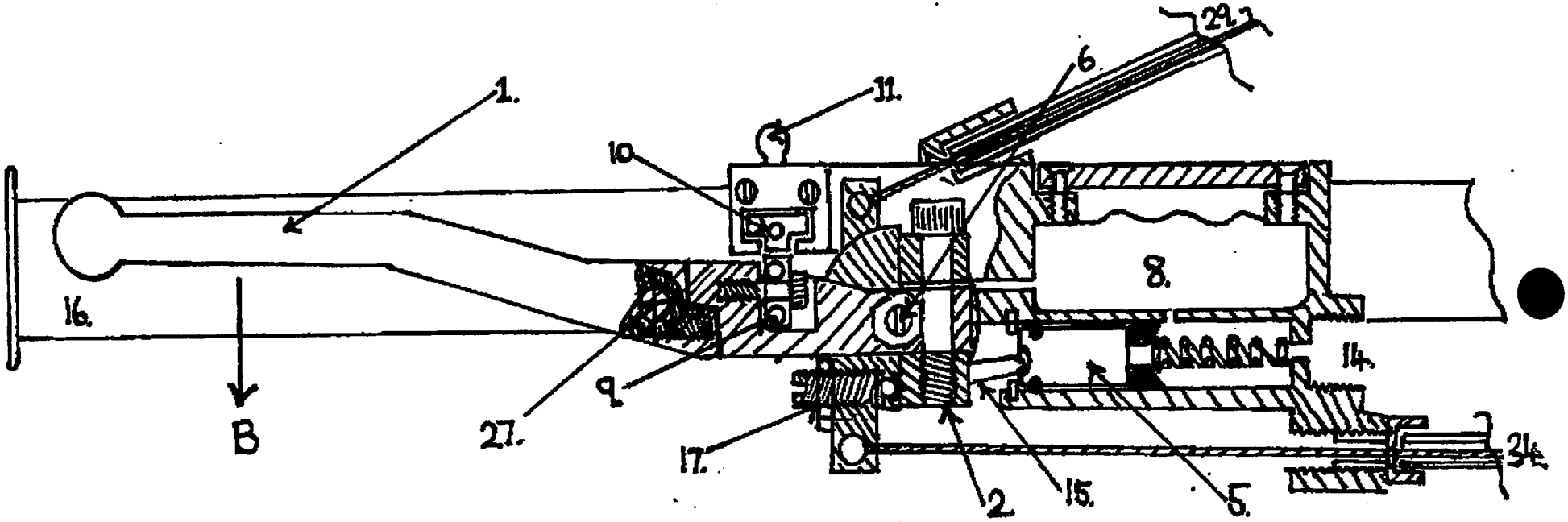


FIGURE THREE

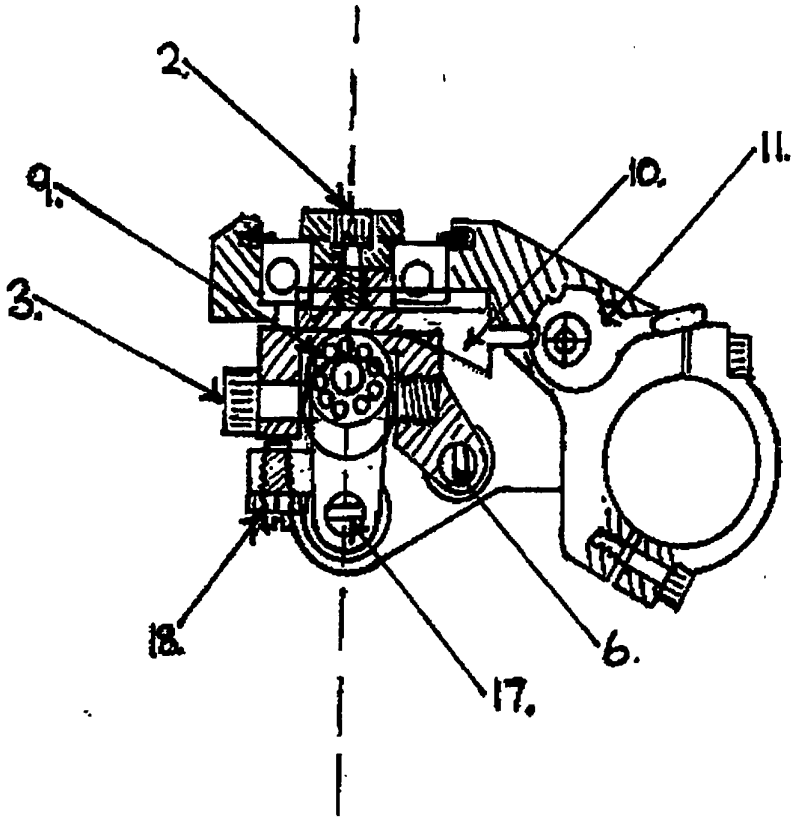


FIGURE FOUR

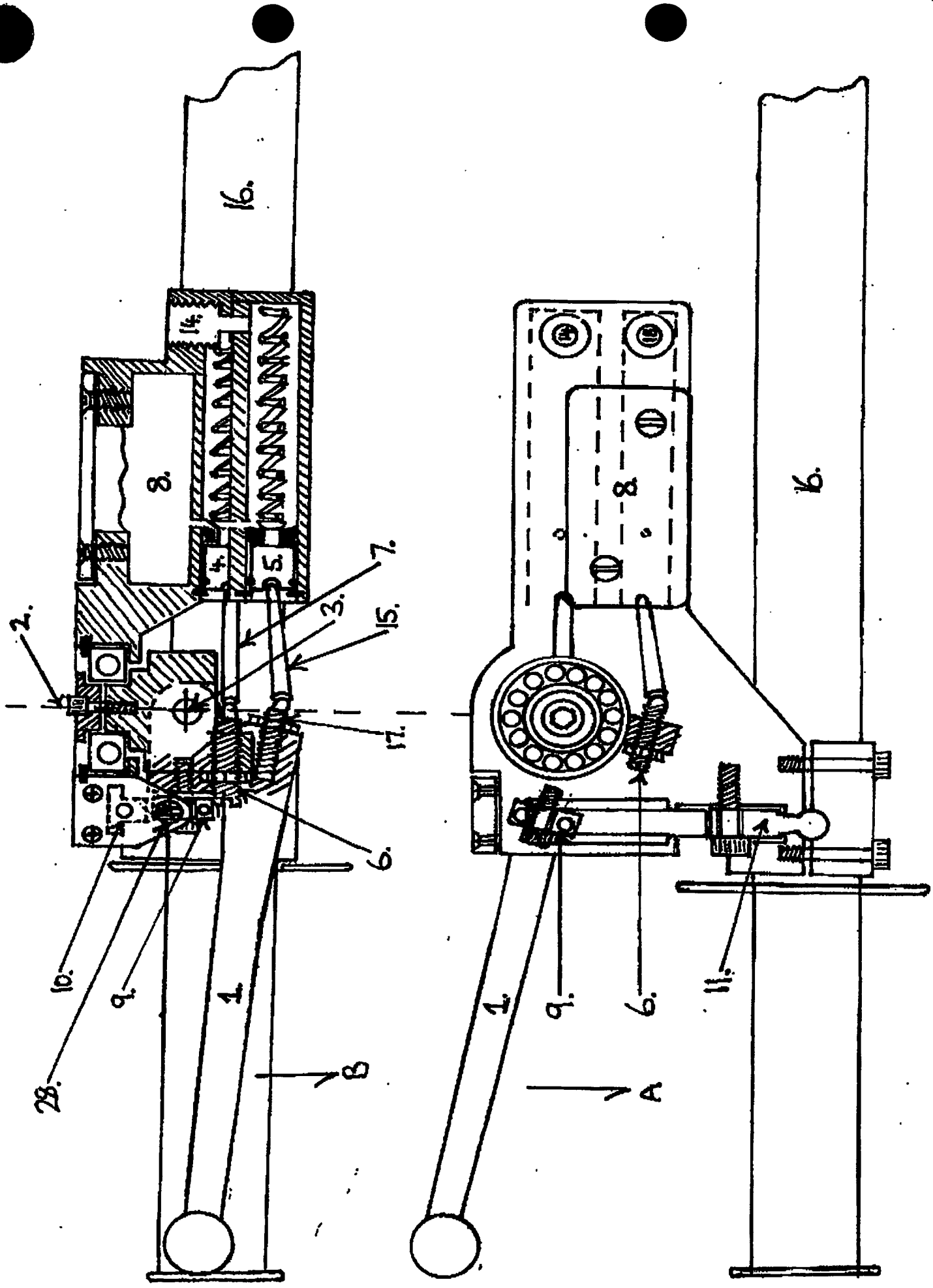


FIGURE FIVE

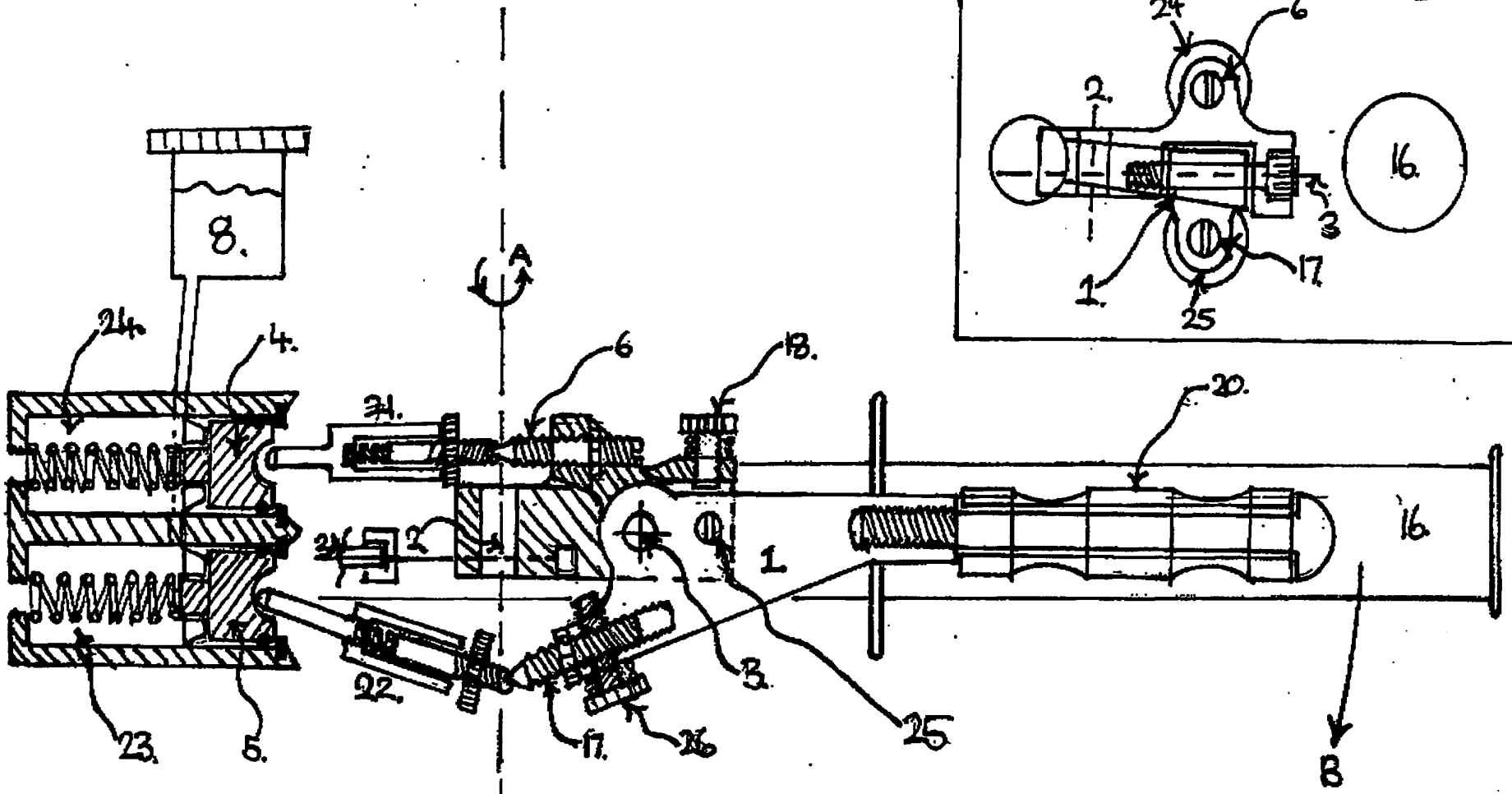


FIGURE FIVE A